MOLLUSCA OF THE SOUTHWESTERN STATES, VIII: THE BLACK RANGE, NEW MEXICO.

BY H. A. PILSBRY AND J. H. FERRISS.

In the summer of 1915, beginning in the second week of August, we collected in the Black Range of New Mexico. Approaching from the west, by way of the Mimbres Valley and up Gallina Canyon, we reached the crest above the head of Silver Creek. Subsequent camps were made at intervals from Sawyer Peak, the southern end of the range, to Reed's ranch on Black Canyon, our route being along the crest trail, with numerous short trips down the slopes, and a two-day trip to Kingston, in the eastern foothills. After September 12th Ferriss continued the exploration alone, in Morgan and Diamond Creeks on the main range, then eastward to Chloride, the Cuchillo Mountains and the San Mateo Mountains, west of San Marcial, in the southern edge of Socorro County. Travel was by pack train. Throughout the trip we had the services of an excellent packer, Teodoro Solis, a native of Chihuahua.

The Black Range is on the boundary between Grant and Sierra Counties, about 40 miles north of Deming, New Mexico. In the north it forms part of the continental divide. The Mimbres River Valley on the west isolates the Black from the Mogollon Range and its outliers. The range is narrow and sharp, its flanks deeply furrowed, but without long spurs. Hillsboro Peak is 10,000 ft. high. Much of the crest trail is from 8,500 to slightly over 9,000 ft. elevation.

Fine forest extends down nearly to the 7,000-foot contour. It has been well protected against fire and its remoteness has deterred the lumberman. The yellow pine, spruce and quaking asp are large and the ground well covered with forest mold.

There seem to be limestone outcrops on all sides of Sawyer Peak. The scattered exposures of these ledges were traced from the south end of the range up the west side at between 7,000 and 8,000 feet, as far as Iron Creek at our Station 16. Limestone was not seen on that side of the range further north, on Black Canyon or Diamond Creek, where it was looked for down to about 6,000 feet. On the east side limestone appears in the foothills at intervals, as around Kingston and Hillsboro, at Hermosa, Chloride, and some distance further north. Otherwise the Black Range is of igneous or meta-

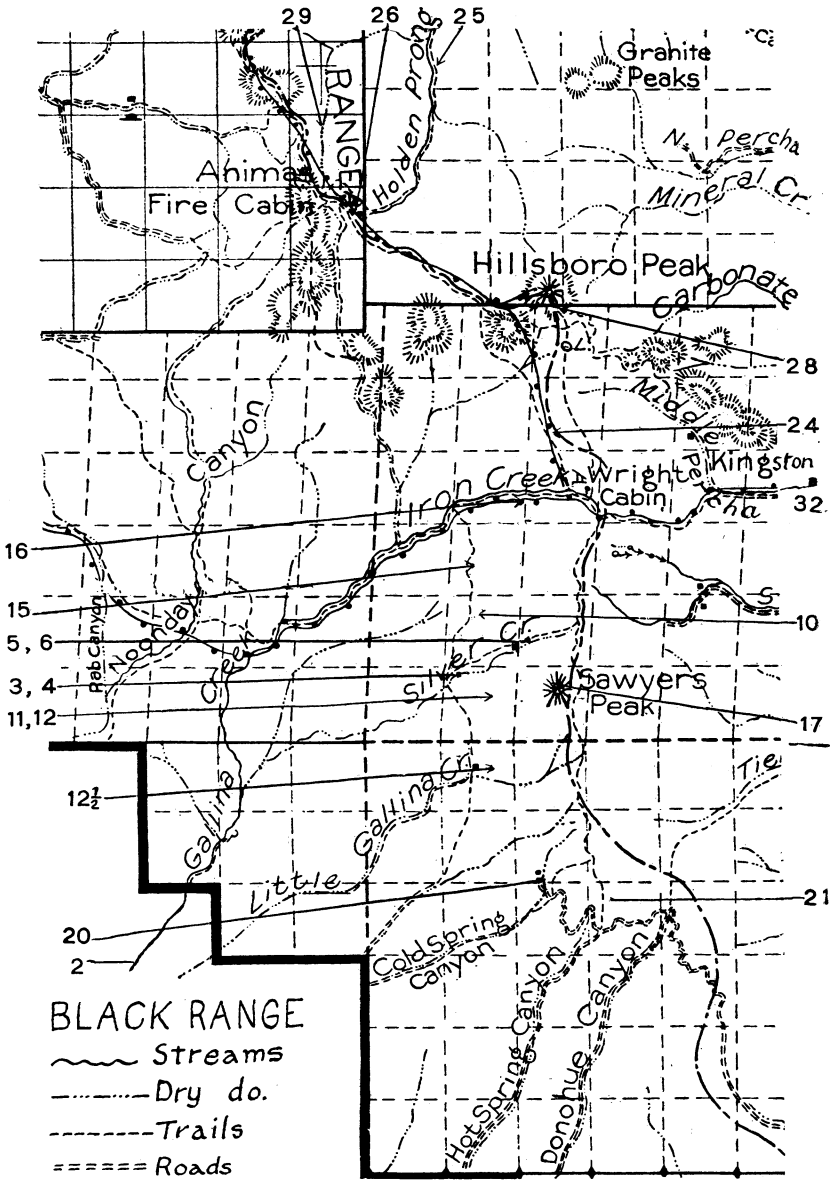

Fig. 1.—Collecting stations in the Black Range, southern section. The map is ruled into square miles.

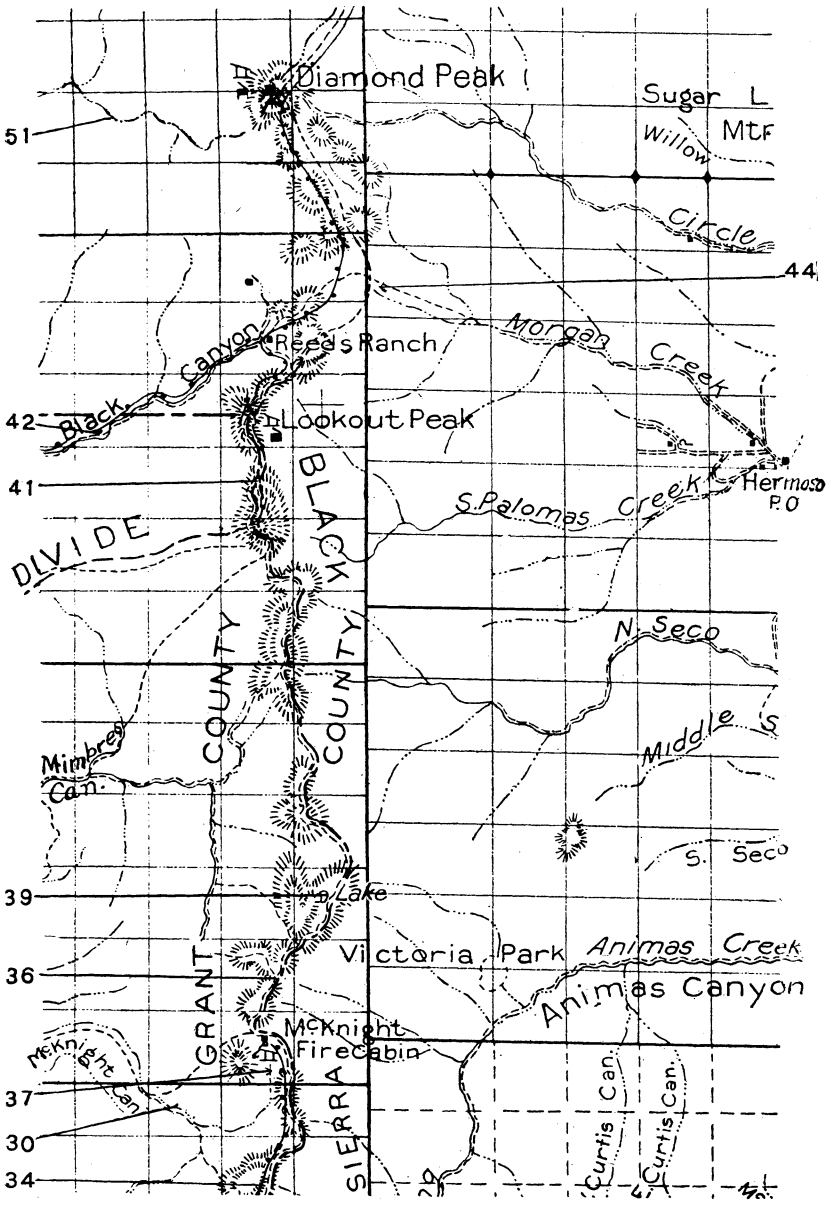

Fig. 2.—Collecting stations in the Black Range, northern section. The map is ruled into square miles.

morphic rock. Except at the southern end, there is no mining in the range at present.

A good crest trail is maintained by the Forestry Service, and several cabins along it are occupied by forest rangers during the dry season. At the time we were there, the range was uninhabited except for two men caring for mines in Silver Creek, and several at Reed's ranch on Black Canyon. Deer, bear and wild turkeys are abundant. There are no rattlesnakes in the forest zone, though occasionally seen up to about 6,000 feet.

Eastern Foothills of the Black Range.—Returning to Deming from Chloride, the limestone ridges about Chloride were found barren of shells, although they had been seen there by miners at an earlier day. At the Oliver Mine, on Mineral Creek, 4 miles above Chloride, *Oreohelix pilsbryi* was found. A few miles southward, on the north side of a limestone mountain at Sam's Canyon, *Holospira cockerelli* was abundant, and a few very old "bones" of *Oreohelix metcalfei* and *cooperi* were found. Again in a like situation on the Little Palomas Creek, *Holospira* was plentiful, and again at Hermosa. This is a small village on the Big Palomas Creek, all that remains of a settlement of over 2,000 miners in flush times. Teodoro had seen shells here years ago, when employed as superintendent at the Ocean Wave Mine, but not even "bones" remain. Across the stream, however, and down stream for a mile or more, *Oreohelix* and *Holospira* were abundant. Hard digging was required to get living shells, as the hillside of fine soil and limestone spawls had been completely plowed up by herds of goats. The snails found shelter under the roots of dead oaks and in undisturbed rock.

In the foothill region there was extensive mining years ago, with consequent destruction of the small wood which grew in favorable places.

Although a sharp lookout was kept, nothing further was found on the return trip except a colony of *Ashmunella* in a slide of igneous rock along the wagon road near the mouth of a small creek tributary to Las Animas River. All were dead except a few very young ones.

No topographic map has been published. Our collecting stations are therefore plotted (pp. 84 and 85) on the Forest Service Temporary Base Map of the Gila National Forest.[1] A list of the stations is given at the end of this article.

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[1] Second edition, corrected to January 1, 1916.

The Cuchillo Range.

This range is about six miles east of Chloride, the post office of Fairview at the foot of the mountains. The peaks probably reach up to 7,500 feet.

On a brushy northern slope on the Thomas Scale trail, in the southern end of the range, *Oreohelix metcalfei cuchillensis* and *Holospira cockerelli* were found in abundance. The cover was scant, and cattle plentiful. Both species were found again a couple of miles further on, in Frank Calhoun's pasture. In both places they lived in groves of oak, under limestone spawls and dead timber.

At the north end of the range the peaks are higher, some having large outcrops of fossiliferous limestone, but the only evidences of living shells obtained were a few "bones" of *Helicodiscus*. In drift debris, however, were many small shells which apparently graze on the grassy slopes and meadows.

The San Mateo Range.

The San Mateo Range probably reaches a height of 8,000 feet. The southern end is about 15 miles north of Mont cello Post Office, a village on the Cañada Alamosa. The rock in this part of the range is a friable, crumbling granite. Nearly the entire southern end is a continuous slope of granitic fragments, many feet in depth. The mesa continues nearly to Monticello. Pinyon, juniper and low-growing shrubs cover the hillsides. Along Chippy Creek, walnut, quaking asp and yellow pine prevail.

Around the edges of the rocky slides, *Oreohelix cooperi* and *Ashmunella* were fairly abundant, but the smaller shells were scarce. A day given to the peaks overlooking San Marcial, a couple of miles farther, added only a few *O. cooperi* to the collection.

Characteristics of the Black Range Mollusk Fauna.

The snail fauna of the Black Range is like that of the Mogollon Range in the rich development of *Ashmunella*, the species being also related. Coarsely granulate species are a unique feature. It differs from the ranges southward and westward by the absence of *Sonorella*. A special feature of the range is the *Oreohelix metcalfei* group, wonderfully varied in shape and sculpture. No doubt further members of this group will be found in Sierra and Socorro Counties. *Oreohelix swopei* also is special to the northern end of the Black Range, so far as we know.

The crest of the range everywhere has an abundant Canadian

zone fauna of small shells, *Vertigo*, *Pupilla*, *Vitrina*, *Thysanophora ingersolli*, etc., in common with similar elevations as far west as the Santa Catalinas in Arizona. Also the Canadian *Oreohelix cooperi*.

List of Species.

The specimens have been studied by both authors. Types are in coll. A. N. S. Phila.; paratypes in coll. Ferriss.

HELICIDÆ.

ASHMUNELLA.

The Black Range Ashmunellas resemble those of the Mogollon and Chiricahua Ranges in the genitalia. The penis is more or less distinctly bipartite by a submedian constriction.

In *A. binneyi*, *A. tetrodon*, and in *A. mogollonensis* of the Mogollon Range, a retractor muscle of a few slender strands attaches to both segments of the penis and to the epiphallus further up, but there is no continuation attaching to the diaphragm.

In *A. mendax* and *A. cockerelli* with its subspecies there is, in addition to the incoherent penial retractor just described, a broad, very thin and extremely short band connecting the epiphallus with the diaphragm. This is similar to the condition in most other Ashmunellas except that the connection with the diaphragm is here very short.

All of the species have the usual short flagellum, about 1.5 mm. long. The constancy in *Ashmunella* of this minute, seemingly vestigeal organ is remarkable.

Aside from the particulars noted above, the organs are much alike in the several species. For convenient comparison the measurements, in millimeters, are given in one table, *A. mogollonensis* being added for comparison.

Ashmunella tetrodon Pils. and Ferr.

Ashmunella tetrodon P. & F., Nautilus, XXIX, June, 1915, p. 15, Pl. 1, figs. 1–3*a*.

Southern slope of the San Mateo Mountains, Socorro County, New Mexico.

This species was described from the western slope of the Mogollon Mountains, and its occurrence in the San Mateo Range appears anomalous. The numerous specimens obtained are quite constant, showing none of the variations noted in the Mogollons.

The genitalia of one of these specimens are figured, Pl. X, fig. 6.

	Length of penis and epiphallus.	Length of penis (swollen basal portion).	Length of vagina.	Length of spermatheca and duct.	Penial retractor inserted on diaphragm.	iam. of shell.	Plate X.
A. mogollonensis	53	3	7.5	42	None	.....	Fig. 3
"	58	6	.....	52	None	.....	
A. mendax, Sta. 2	56	5	9	40	Short	16.5	Fig. 1
" Sta. 32	54	4.5	6.5	63	Short	19	
" Sta. 16	61	6.5	8.5	42	Short	20	
" Sta. 26	35	3.5	.....	.....	Short	17	
A. binneyi, Sta. 15	42	.....	.....	25	None	.....	
" Sta. 13	35	4.5	6.5	22	None	15.5	
" Sta. 7	42	4.5	.....	34.5	None	15–16	Fig. 5
A. cockerelli, Sta. 20	45	5.5	5	35	Short	17	Fig. 2
A. c. perobtusa, Sta. 21	40	5.5	5	23	Short	16.7	Fig. 4
A. tetrodon, S. Mateo	28	4	5	23	None	13.5	Fig. 6
A. t. animorum, Sta. 26	37	4	6	31	None	14	

Ashmunella tetrodon fragilis n. subsp. Pl. VII, figs. 1–1*b*.

The shell is markedly thinner than *A. tetrodon*, and subangular peripherally, the periphery situated high. Basal teeth small and well separated. Parietal tooth smaller than in *A. tetrodon*. There is no denticle between its inner end and the upper termination of the lip.

Alt. 6.5, diam. 14 mm.; $5\frac{1}{3}$ whorls. No. 115,753, A. N. S. P.

One colony was found, Station 58, in slides on south side of Cave Creek, near its mouth, and an equal distance from where the wagon road starts up a long-grade hillside on the trail from Chloride to Hillsboro, in the eastern foothills of the Black Range.

Ashmunella tetrodon animorum n. subsp. Pl. VII, figs. 2–2*b*.

The shell resembles *A. tetrodon*, but differs by having the basal teeth much closer together and united by a callus. The parietal tooth is simple; the outer lip-tooth is long. Color light buff, with a slightly brownish tinge above. Under a strong lens some imperfect granulation is produced by the interruption and irregularity of the growth striæ on the penult whorl. There is also an extremely minute spiral striation on the later whorls.

Alt. 7, diam. 15 mm.; $5\frac{1}{4}$ whorls (type, No. 115,747).
" 5.4, " 12 " (Station 36).

Black Range, from Station 26, Holden's Spring (type loc.), north-

ward to Black Canyon (Reed's) and Morgan Creek. Taken at 15 stations.

This is a common shell at high elevations, in the mountains north of Hillsboro Peak. Especially in the labyrinth of canyons forming the heads of Las Animas Canyon, but also on the western slope of the range. Most of the stations are between 8,000 and 9,000 feet. It was found mainly under dead wood on shady and rather humid slopes.

Very often the inner of the two basal teeth is wanting, being reduced to a sloping callus against the other tooth.

Ashmunella cockerelli n. sp. Pl. VII, figs. 3, 4, 9.

The shell is umbilicate (umbilicus between one-fifth and one-sixth the total diameter, enlarging in the last half whorl, rather tubular further in); depressed; *carinate at the periphery;* the shape recalling *Polygyra carolinensis* and *obstricta;* wood-brown above, usually somewhat paler at the base, having a buff streak indicating a former resting stage about the middle of the last whorl. Surface lusterless except the earliest whorls. *Sculpture of close-set, irregular pebble-like granules* on the last whorl, finer on the whorl preceding, before which it is finely striate and slightly punctate, the first $1\frac{1}{2}$ whorls smooth and glossy. The inner whorls are convex, the penult whorl flattened, the last somewhat convex above, but excavated on both sides of the strong peripheral keel. It is rather swollen below the keel, particularly in the last half. It descends shortly in front, and is guttered behind the outer and basal margins of the lip. The aperture is very oblique, subcircular and toothless. Lip is reflected and somewhat thickened within.

Alt. 8.2, diam. 16.4 mm.; $5\frac{1}{3}$ whorls (type, figs. 3, 9).
" 7.2, " 17.8 "

South of Sawyer's Peak, on slopes of the ravine at Grand Central Mine (Station 20), and in the next two ravines on the trail to the peak (stations 19 and 22). Also further north at Station $12\frac{1}{2}$, a short distance above Spade's cabin.

This species, which it gives us pleasure to name for Professor T. D. A. Cockerell, is remarkable for its strong carina and roughly pebbly sculpture, which is coarsest on the latter part of the whorl. The upper surface is usually convex, but often nearly flat. The periphery of the penult whorl frequently projects a little above the suture in the individuals with flattened spire.

Ashmunella cockerelli perobtusa n. subsp. Pl. VII, figs. 7, 7*a*.

The shell is sharply angular in the young, and on the front of the last whorl, but *becomes rounded and rather swollen in the last third. The granulation is minute*, as in the following race, and in places the granules are linked into spiral lines.

Alt. 7.8, diam. 16 mm.; $5\frac{1}{3}$ whorls.

Locality, Station 21, a ravine about two miles to the left of the trail (going down) from the camp site on Sawyer Peak to the Grand Central Mine, and at a somewhat higher level than the mine.

Type No. 115,750, A. N. S. P.; paratypes in Ferriss coll.

As one of the authors was lost when he found this colony, its exact location cannot be made perfectly clear; yet by turning along a trail which branches to the left before the steep descent into the second ravine from the Grand Central Mine, the snail hunter must get into the vicinity of the *perobtusa* colony. It is in a ravine on the left side of said trail.

Ashmunella cockerelli argenticola n. subsp. Pl. VII, fig. 5.

This form differs from *A. cockerelli* by the far smoother surface; the granulation being very fine, and on the base the granules are connected into spiral threads, closely placed, and not visible over the whole base. The keel is strong, and continues to the lip, thereby differing from *A. c. perobtusa*.

Alt. 7.4, diam. 16 mm. (type).

Upper Silver Creek and its branches, above 7,500 feet, to the northern flank of Sawyer Peak, about 500 feet below the summit. It was taken at stations 3, $4\frac{1}{2}$, 6 and 9 on Silver Creek, 10 and $10\frac{1}{2}$ on a tributary from the north which enters at Mitchell Gray's cabin, 11, gulch south of Gray's cabin, and $17\frac{1}{2}$ near the summit of Sawyer Peak. The type locality is Silver Creek just below the box, where the trail makes a detour on the steep northern slope. This is probably between 8,000 and 8,500 feet, Gray's cabin being at 7,500 feet.

In the type locality, Station $4\frac{1}{2}$, the diameter is 15 to 16 mm., and the keel projects but little or not at all above the suture. Some lots vary more. At Station 11 the diameter is from 13.7 to 16 mm., and the keel of the penult whorl often projects. In some lots there are coarse, conspicuous wrinkles of growth, as at Station 10. The spire varies in convexity in all lots, and is often almost flat.

Ashmunella binneyi n. sp. Pl. VII, fig. 8.

The shell is depressed, with low but convex spire and angular periphery; isabella color above, paler below. Sculpture of very minute, interrupted, somewhat anastomosing striæ along growth-lines; some weak traces of spiral lines on the base. Whorls slowly

widening, convex, the last angular or subangular in front, descending a little to the aperture. Umbilicus widening rapidly in the last whorl, one-fifth the total diameter. Aperture toothless, rounded, lunate, the peristome white, evenly and rather narrowly reflected throughout.

Alt. 7, diam. 15.5 mm.; 5 whorls. (Type, Station 8½.)

Diam. 13.5 to 16.7 mm. (Station 15).

Black Range at stations 7 and 8½, on Silver Creek above the "box"; 13, head of Bull Top Creek, and 15, Spring Creek, a tributary of Iron Creek. The type locality, Station 8½, is near the deserted cabin just above the box of Silver Creek, at an elevation of about 8,500 feet.

This species differs from *A. mendax* by the angularity and the microscopic sculpture of the last whorl. Also by the absence of any penial retractor muscle attached to the diaphragm. It is far smoother than any form of *A. cockerel'i*, and not carinate.

It is certainly far less widely spread than *A. mendax*. We found it only in an area of a couple of miles along the western flank of the range, from Upper Silver Creek to Upper Spring Creek, well within the heavily forested zone. No doubt it will be found over a somewhat wider area; yet its absence in our many stations both north and south indicate that it is a relatively local species.

Ashmunella mendax n. sp. Pl. VII, figs. 6, 6*a*, 6*b*.

The shell resembles *A. mogollonensis*, but is less robust, with different microscopic sculpture, lighter colored, being between tawny-olive and saccardo umber, often with a lighter streak from a former resting period. The third and fourth whorls have minute growth-wrinkles interrupted to form oblong granules in places, and an excessively minute spiral striation. On the last whorl the growth-wrinkles are low, unequal and continuous, and there are many weakly impressed spiral lines. Last whorl descends slightly in front. The aperture is small, toothless; lip white, narrowly reflected. The umbilicus is cylindric within, but in the last whorl opens out to more than twice its former diameter.

Alt. 9.3, diam. 20, width of umbilicus 5.2 mm.; 5½ whorls.

Black Range, at the following stations: 2, Gallina Canyon, 4 miles above Pryor's upper cabin. Sawyer Peak at stations 18, northeast, and 23, east of camp on the saddle, about 20 minutes' walk down the mountain. Stations 16, Iron Creek above confluence of Spring Creek, and 16½, around Wright's cabin, near the head of the creek. Station 26, Holden's Spring, at one of the heads of Holden's Prong of Animas Canyon. Station 28, southwest side of Hillsboro

Peak. Station 27, west of Animas ranger cabin, and Station 30, about 3½ miles west, down the mountain. Station 49, Black Canyon, above Diamond Bar ranch house, on the western slope of the range. Station 32, garden of Stephen Reay, west end of Kingston. Type locality, Station 16.

The shell, while superficially very like *A. mogollonensis*, is easily distinguished by the somewhat granose intermediate whorls and far less deeply engraved last whorl. In *A. mogollonensis* there is no granulation, and the last whorl is very deeply and closely engraved spirally (Pl. VII, fig. 10). In the genitalia, the presence of a very short, broad penial retractor attached to the diaphragm distinguishes *mendax* (Pl. X, fig. 1) from *mogollonensis* (Pl. X, fig. 3), in which there is none.

This snail has a remarkable range. The lowest colonies on both sides are far below the forest, especially on the west side, where it was found in great numbers in the arid Gallina Canyon. The examples here are rather small, diam. 16 to 17.3 mm. On the east side we took it under wood and rubbish in a garden of Kingston, where it was common. Most of the other localities are along the crest of the range, in the humid forest zone. The type locality is on the south side of Iron Creek some distance above the mouth of Spring Creek, at the entrance of a ravine from the south, where there has been rather extensive mine prospecting.

A figure of the genitalia of *A. mogollonensis* P. & F. is given for comparison, Pl. X. fig. 3.

OREOHELIX.

Three of the four species belong to the southern group of species having swollen penes. The fourth, *O. cooperi*, is here at the southern border of its vast range.

Most of the specimens taken between the middle of August and the middle of October contained embryos. A few collected in the latter part of October contained none.

Oreohelix swopei n. sp. Pl. IX, figs. 2, 3–3*b*.

The shell resembles *O. strigosa depressa*. It has an ample umbilicus, a low, conic spire, obtuse and rounded at the summit, and a slightly angular periphery. Color fawn or vinaceous fawn, with two chocolate or lighter bands in the usual positions, and finely, irregularly speckled and streaked with creamy markings, partly the result of wear. The surface is glossy where unworn, marked with irregular growth-lines and fine wrinkles, which form sharp little folds just above the suture on some of the intermediate whorls. No spiral striation. The embryonic shell, of 2⅓ flat whorls, shows growth-

lines and faint traces of microscopic spirals, and on its last third there are usually several small spiral threads. The young stages have an acutely angular periphery, which becomes bluntly angular on the last whorl, which descends very little in front. The aperture is strongly oblique.

Alt. 12, diam. 21 mm. (type).
" 12, " 22 "
" 13.2, " 20 "

Black Range, at stations 44, 45 and 48, head of Morgan Creek; 42, Black Canyon, 4 miles below Reed's ranch; 50 and 51, on Diamond Creek, about 3 miles below the summit, and again about half way down.

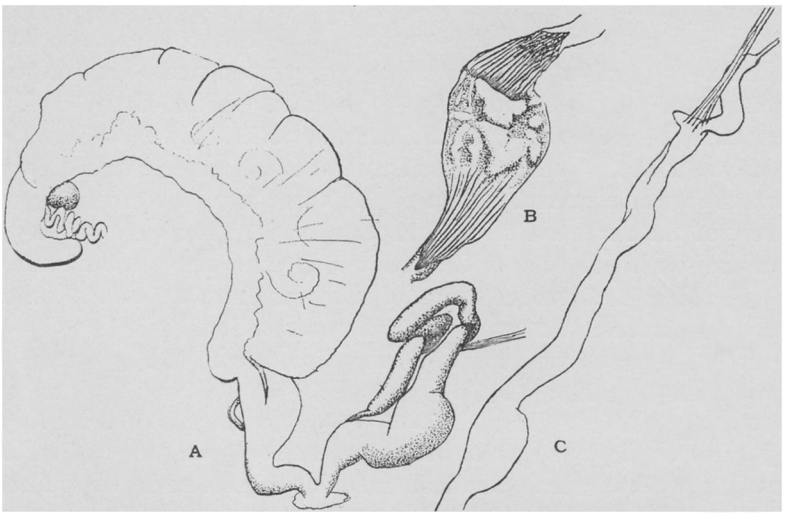


Fig. 3.—Reproductive organs of *Oreohelix swopei*. *b*, the penis opened, showing fleshy organs in the swollen portion. *c*, the penis and epiphallus stretched straight.

This snail is named in honor of Dr. S. D. Swope, of Deming, New Mexico, in acknowledgment of his interest in scientific matters and his kindly help in furthering our investigation. That we visited the Black Range at all was due to his alluring picture of its beauties.

In the field this shell was taken for *O. s. depressa*. It was found among rocks on the well-shaded slopes of ravines, usually with *O. cooperi* and *Ashmunella*. The absence of spiral striation on the last whorl aroused suspicion of the reference to *O. s. depressa*, and on closer study it was found to differ by the far smoother embryonic shell, and especially by the soft anatomy, the male organs being quite different in the two species. In *O. s. depressa* the lower part

of the penis is not swollen, and its cavity contains four or five subequal longitudinal ridges. These structures have been found constant in a great many specimens dissected, from Utah, Colorado, Arizona and New Mexico.[2] In *O. swopei* the lower part of the penis is conspicuously swollen, its cavity containing several large, irregular, fleshy processes (fig. 3*b*), below which there are many small longitudinal cords (fig. 3).

The organs measure:

Length of penis	22	mm.
" swollen portion of penis	8.5	"
" of epiphallus	4.5	"
" of penial retractor	7	"
" of vagina	6.5	"
" of spermatheca and duct	21	"
Diameter of shell	21	"

O. concentrata differs by its far shorter penis.

In the specimen dissected, taken about September 15, there were eight embryos (Pl. IX, fig. 13), the largest 4.2 mm. diameter. The base shows many smooth spiral lines and bands cutting through densely crowded, crinkled radial striæ. When these are worn off it appears almost smooth, the apparently strong spiral sculpture shown in the figures being cuticular.

A few beautiful albino shells were found in one rock pile in Station 45.

Oreohelix metcalfei Ckll. Pl. VIII, fig. 5.

Oreohelix strigosa metcalfei Ckll., Nautilus, XVIII, 1905, p. 113. Pilsbry, Proc. A. N. S. Phila., 1905, p. 278, Pl. 25, figs. 44, 48, 52.

This species was described from shells collected by Mr. O. B. Metcalfe "near Kingston," the exact spot not designated. We hunted one day around Kingston, but did not find it. The country near the town is rather discouraging—steep stony hills with practically no shade, though there is abundant limestone. Probably we did not go far enough afield. We suspect that the colony was either nearer the mountains or northward, probably not in the immediate vicinity of the town.

Three very old "bones" were found by one of us in Sam's Canyon, Station 53, some miles south of Chloride. These occurred with *Holospira*, like the original lot.

It appears that the *O. metcalfei* group, in Grant, Sierra and Socorro Counties, comprises a series of forms largely parallel to the *O. haydeni* series in Utah and Colorado, but even more remarkable in its extremes of form and sculpture.

[2] See these PROCEEDINGS for 1905, p. 272, Pl. 19, fig. 3; 1916, p. 345, Pl. 19, figs. 1–4, 6, 7; Pl. 20, fig. 8.

On the west slope of the Black Range there are two forms: (1) in the south, *O. m. concentrica*, broadly umbilicate, with low, wide spiral cords on the base, and (2) further north, *O. m. radiata*, with strong radial sculpture, remarkably like *O. elrodi*. On the eastern slope we have (3), southward, *O. m. acutidiscus*, broadly umbilicate, with fine spiral and coarser radial sculpture, and (4) further north, *O. hermosensis*, nearly smooth, angular only in front. Still further north a few "bones" of typical *metcalfei* were found, acutely keeled throughout and nearly smooth. Northeast of here was found *O. m. cuchillensis*, which is so weakly angular that we at first thought it a form of *O. strigosa depressa*. Further west *O. pilsbryi* was found. Further north, in Socorra County, there is *O. socorroensis*, an angular, roughly sculptured shell, as yet known only by perfectly bleached "bones."

The *metcalfei* group therefore comprises, besides the original type, forms resembling *O. haydeni*, *O. elrodi* and *O. strigosa depressa;* each being alone in its district. The distribution may be represented diagrammatically thus:

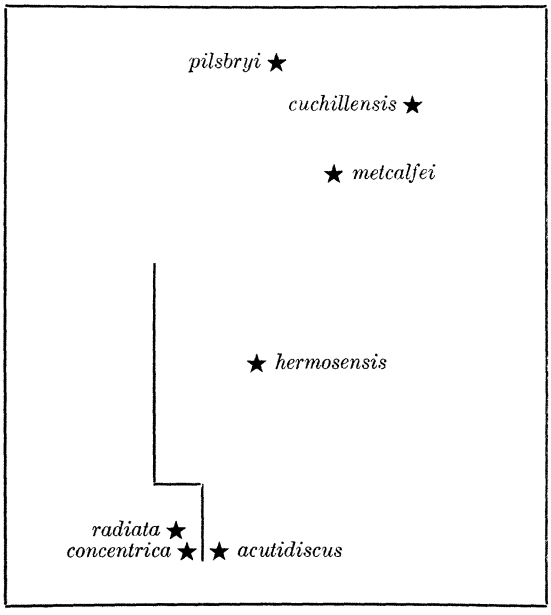


Diagram to show localities of the races of *Oreohelix metcalfei* relative to one another and to the crest of the Black Range from Sawyer to Diamond Peak. Scale about 16 miles to an inch.

Oreohelix metcalfei concentrica n. subsp. Pl. VIII, figs. 1–1*d*.

The shell is much more broadly and openly umbilicate than *O. metcalfei;* cartridge buff, inconspicuously mottled with gray or light drab, the embryonic whorls pinkish cinnamon, and the peripheral keel bordered below with a brown band. Sculpture of about five extremely low spiral cords on the base, and usually traces of two or three above, their intervals finely and sharply striate spirally, and there are very fine, irregular striæ along growth-lines, sharp where they pass over the keel and spiral cords, elsewhere weak. The last whorl does not descend in front.

Alt. 9.3, diam. 21.5 mm.; $4\frac{3}{4}$ whorls.

Silver Creek, above 7,500 feet, at stations 3, $4\frac{1}{2}$, 7, and 11, on limestone outcrops. Type No. 115,755, A. N. S. P. from Station 7, above the box of Silver Creek, on the north side.

In most specimens the intervals between the cords on the base are dull brown, or when concolored the spiral striæ make them appear darker, giving an appearance of relief to the cords. A few individuals from Station 11 (a branch ravine of Silver Creek south of Gray's cabin) have the base blackish chocolate.

Specimens with the spiral cords on the base less conspicuous and the color usually darker—clouded and banded with dull walnut brown in varying degree—were found at Station 20, at the Grand Central Mine; Station 19, the next gulch north of that where the mine is; also Station 22, the succeeding gulch north (Pl. VIII, fig. 1*d*). At Station $17\frac{1}{2}$, on the west side of Sawyer Peak about 500 feet below the summit, similar shells were found, varying from nearly typical color to broadly banded below with chocolate, the spiral cords therefore inconspicuous.

Genitalia as in *O. m. radiata.*

The embryonic shell (Pl. IX, fig. 10) is very beautiful. The first whorl is smooth, cuticular laminæ along growth-lines then appearing gradually. From these triangular processes rise, forming 3 or 4 spiral series above, usually 4 below a peripheral series of larger processes.

The embryos of *radiata, acutidiscus* and *hermosensis* are identical with those of *concentrica.*

Oreohelix metcalfei radiata n. subsp. Pl. VIII, figs. 2, 2*a*, 3–3*c*, 6, 6*a*.

The shell is more openly umbilicate than *O. metcalfei,* with irregular sculpture of strong wrinkles in the direction of growth-lines, the lens showing fine spiral striæ between the wrinkles of the lower surface, very few on the upper surface. Faint traces of a few coarse spirals

on the base may be discerned in most examples. The last whorl usually does not descend in front (but in some exceptional specimens it descends). The typical color is cartridge-buff, with some cream-buff clouding above, the early whorls being light pinkish cinnamon; but it varies, some shells having a bister band below the periphery, or this may be widened, suffusing much of the base (figs. 6, 6*a*), with also a cinnamon line on the upper surface. In a few examples, all of the base except within the umbilicus is between chocolate and black, the upper surface being brownish.

Alt. 9, d am. 19.4 mm.

Limestone outcrops on Iron Creek, Station 16, some distance above the confluence of Spring Creek and on Spring Creek, Station 15 (type loc.).

The Iron Creek specimens are nearly all of the pale typical color.

The genitalia of a specimen from Station 15, the type locality, were figured, *sub nom. O. metcalfei*, in PROC. A. N. S. PHILA., 1916, p. 352, Pl. XXII, fig. 10. Embryonic shell (Pl. IX, fig. 11) as in *O. m. concentrica*.

Oreohelix metcalfei acutidiscus n. subsp. Pl. VIII, figs. 4, 4*a*.

Broadly umbilicate, like *O. m. concentrica*, from which this race differs by having stronger growth-wrinkles (though much less coarse than in *O. m. radiata*), and in place of the spiral cords of *concentrica* there are slightly enlarged striæ, the whole base being finely striate spirally between the riblets. It is mottled and clouded profusely, above and below, with walnut brown. The keel is very acute.

Alt. 10.4, diam. 22.4 mm.; $5\frac{1}{3}$ whorls.

Station 23, about 1,000 feet below the summit of Sawyer Peak, east of and below the camp site on the saddle, on a small outcrop of limestone.

In another place down the mountain southeast from camp, Station 18, we found a colony differing by being cartridge buff, a few with a band below the periphery. Both of the localities are on the opposite side of the mountain from the known localities of *O. m. radiata*. The embryonic shells are like those of *radiata* and *concentrica*.

Oreohelix metcalfei hermosensis n. subsp. Pl. IX, figs. 4, 4*a*, 4*b*.

The shell is solid, cartridge buff with a narrow chocolate band below the periphery, and some indistinct pinkish cinnamon mottling, especially above. The surface is nearly smooth, having light irregular growth-lines and no spiral striæ. The last whorl descends in front. It is strongly angular in front of the aperture, the angle becoming weak on the last half. The umbilicus about as in *metcalfei*.

Alt. 12.3, diam. 21.4 mm.; $5\frac{1}{3}$ whorls.

Stations 55 and 56, near Hermosa, Sierra County, New Mexico.

This subspecies resembles *O. metcalfei* in color and the smooth surface, but differs by wanting the strong keel of the last whorl.

Genitalia are substantially as in *O. m. radiata*. The penis is figured, fig. 4*a*, and opened, fig. 4*b*. The lower portion has several very irregular and unequal fleshy ridges within, upper portion papillose. Length of penis 13 mm., of its thickened lower part 5 mm.; length of epiphallus 3.5 mm.; of penial retractor 6 mm. Diameter of the shell 20.5 mm.

The embryonic shells (Pl. IX, fig. 12) are exactly as in the forms of *metcalfei* from the Black Range. In the adult shell the embryo photographs abnormally dark on account of its yellow hue.

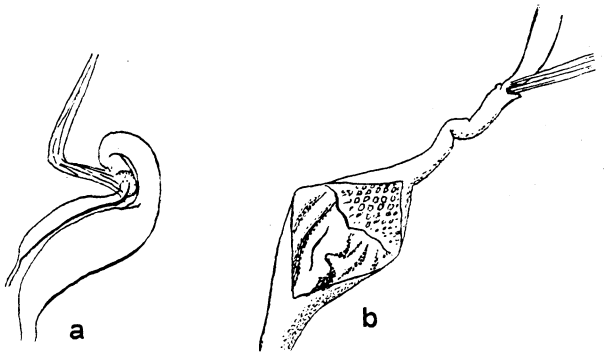


Fig. 4.—Penis of *Oreohelix metcalfei hermosensis*. *a*, exterior; *b*, the same opened.

Oreohelix metcalfei cuchillensis n. subsp. Pl. IX, figs. 1, 1*a*, 1*b*.

This form is smaller than *hermosensis*, and the peripheral angle in front of the aperture is weaker, scarcely noticeable. Typically there are very minute and superficial spiral striæ, but on many specimens these cannot be made out. The last whorl descends little or not at all in front. There is about a half whorl less.

Alt. 9, diam. 18.2 mm.; $4\frac{3}{4}$ whorls.

Cuchillo Mountains, Sierra County, at two stations about two miles apart, at the southern end of the range.

We have hesitated between uniting this with *O. m. hermosensis* and giving it separate standing. The sizes intergrade in a small number of specimens, *cuchillensis* varying from 15.4 to 20 mm. diameter; yet where this is the case, the specimens are readily separable by other characters. Except for one specimen of 20 mm. diam., none of the lot of over 200 specimens exceeds 19 mm. diameter.

The genitalia are substantially similar to *O. m. hermosensis* except for the smaller size. Length of penis 7, of its internally thickened lower portion 4 mm.; of epiphallus 3 mm.; of penial retractor 6.5 mm.; diam. shell about 17.5 mm. (No. 112,917, A. N. S. P.)

No embryos were found in a few specimens preserved in spirit, taken in October.

Oreohelix pilsbryi Ferriss. Pl. VIII, figs. 7-7*c*.

Oreohelix pilsbryi Ferriss, Nautilus, XXX, January, 1917, p. 102.

While closely related to *O. metcalfei*, this form appears to be sufficiently distinct for specific rank. It is most like *O. m. concentrica*, but differs by the narrow, strongly raised spiral liræ and the smaller umbilicus. It is also relatively higher, resembling some forms of *O. haydeni* from the Oquirrh Range, in Utah. There are usually four spirals on the base, two on the upper surface. The embryonic whorls of adults and the genitalia (figured in PROC. A. N. S. PHILA., 1916, Pl. XXII, fig. 8) are substantially as in *O. metcalfei radiata* and the other forms of that species. Embryos were not found in the uterus in the few specimens preserved in spirit.

It was found only near the Oliver Mine, on Mineral Creek, about 6 miles from Chloride, Sierra County. Several hundred living examples were obtained. See *Nautilus*, XXX, p. 102.

Oreohelix cooperi (W. G. B.) Pl. IX, figs. 5–9.

This region, which forms the southern border of the vast area of *cooperi*, has a capacious form of the species. Many examples are typical in coloring (figs. 7, 9), but pale shells with faint bands or none are abundant, especially on Silver Creek (figs. 6, 8, 8*a*). Occasionally throughout the range, specimens were found with very broad, almost black bands (figs. 5, 5*a*). These color forms are to be found together throughout the forest zone of the range. Thus, figs. 5–7 (Station 9) and 8, 8*a* (Station 4½) are from Silver Creek; fig. 9 from Holden's Spring (Station 26). The extremes of elevation of the spire may also be found in single colonies. The shape and color mutations or forms are spread throughout the range, though particular color-forms are often prevalent at one or another station.

The specimens figured measure as follows:

Figs. 5, 5*a*,	alt. 14,	diam. 20 mm.
Fig. 6,	" 13,	" 20 "
Fig. 7,	" 15.6,	" 20.6 "
Figs. 8, 8*a*,	" 16.7,	" 22 "
Fig. 9,	" 14.3,	" 20.5 "

Localities in the Black Range and environs are given below. It is not confined to limestone exposures, but is quite sparsely scattered on shaded hillsides throughout the forested zone of the range from Sawyer Peak northward.

Sawyer Peak, Station 17½, west side of the north peak, near the summit.

Silver Creek, at stations 3, 4½, 6, 7, 9; Bull Top Creek, Station 13.

Spring Creek, Station 15; Iron Creek, stations 16 and 16½ (Wright's cabin). Between Iron Creek and Hillsboro Peak.

Heads of Animas Canyon at Holden's Spring, Station 26, and at stations 29, 30, 32, 33, northward.

Near McKnight's cabin, Station 36; stations 38, 39½, 40, the last 8 miles north.

Black Canyon region at stations 41, 42.

Morgan Canyon, stations 44, 45, 48.

Diamond Creek, Station 50, about halfway down the mountain on the west side.

East of the Black Range it was taken at—

Sam's Canyon, about 6 miles south of Chloride, dead only.

San Mateo Mountains, everywhere on the south side, abundant.

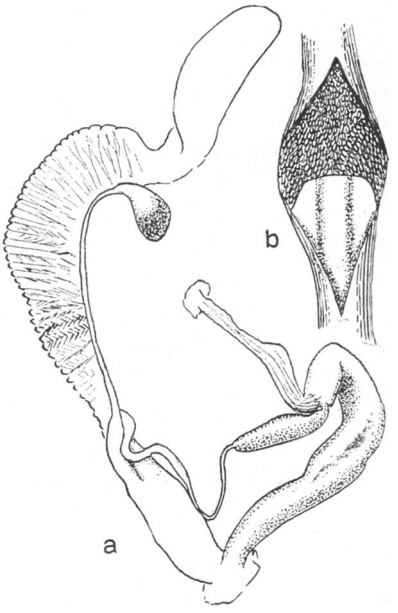


Fig. 5.—Reproductive organs of *Oreohelix cooperi* from Holden's Spring, Black Range, with detail of the penis, opened at upper end of the internally ribbed portion.

Specimens from Holden's Spring (Station 26) were dissected last year. See PROC. A. N. S. PHILA., 1916, p. 351. Two more have been opened, giving the following measurements of the genitalia:

	No. 115,156. Silver Creek. Station 4½.	No. 112,920. San Mateo Mountains.
Length of penis	21 mm.	13.5 mm.
" " internally ribbed part	11 "	8 "
" " epiphallus	4.5 "	5 "
" " penial retractor muscle	10 "	7 "
Diameter of the shell	22 "	..... "

The lower part of the penis contains two or three fleshy ridges, the upper ends of which project a little into the cavity of the thin-walled portion.

Thysanophora ingersolli (Bld.).

Common throughout the humid forested zone, especially among aspens. Taken at 16 stations, from Sawyer Peak to Black Canyon.

Thysanophora hornii (Gabb).

Not found in the Black Range. A few were taken in the Cuchillo Mountains.

UROCOPTIDÆ.

Holospira cockerelli Dall.

Holospira cockerelli Dall, Nautilus, XI, October, 1897, p. 62. Pilsbry, Proc. A. N. S. P., 1905, p. 218, Pl. 26, fig. 6.

Sam's Canyon, about 4 miles south of Chloride. Cuchillo Mountains. Big Palomas Creek, near Hermosa, in a mountain across stream, above the fork, at Ocean Wave Mine; also in the next peak below. Little Palomas Creek, in a limestone mountain 2 miles north of Black Bob's ranch.

The specimens from the Little Palomas are about typical in size

Length 12.5 mm., $13\frac{1}{2}$ whorls.
" 10.5 " 12 "

The largest are from the Cuchillo Mountains on the south side of the peak, where some are 16.8 mm. long, with $16\frac{1}{2}$ whorls. Specimens from the other localities are intermediate in size. All we have opened have a single short lamella low on the axis in the penult whorl.

The type was found in drift debris of the Rio Grande. Subsequently Mr. Metcalfe found one "near Kingston"—probably northward near the southern localities given above.

We did not find *Holospira regis* Pils. and Ckll., which was collected by Mr. Metcalfe somewhere in the Kingston district.

ENDODONTIDÆ.

Pyramidula cronkhitei (Newc.).

Found everywhere (18 stations) throughout the wooded zone. Also in the Middle Percha drift below Kingston, Mineral Creek near Chloride, and Little Palomas Creek; probably washed down from above.

Helicodiscus arizonensis P. and F.

Rather sparingly found at many stations throughout the Black Range, from the summit to the level of Kingston. Also San Mateo and Cuchillo Mountains.

VITRINIDÆ.

Vitrina alaskana Dall.

From the summit of the ascent north of Wright's cabin northward to Black Canyon; abundant, especially near McKnight's cabin, on bits of wood, etc. Not seen south of Iron Creek.

ZONITIDÆ.

Polita indentata umbilicata (Ckll.).

Black Range on Silver Creek; head of Iron Creek, Station 16½; Animas Creek above the box, Station 25; Bear Wallow, Reed's ranch, Station 43. It is rare at the higher levels. In dryer, lower country it was taken at Station 1, Gallina Creek, on Little and Big Palomas Creeks, near Chloride, and in the Cuchillo and San Mateo Mountains.

Zonitoides arborea (Say).

Found throughout the Black Range; taken at 17 stations.

Zonitoides minuscula alachuana (Dall).

Iron Creek, stations 16, 16½; Holden's Spring; drift of Percha below Kingston; Oliver Mine, near Chloride.

Striatura milium meridionalis P. and F.

Station 28, south side of Hillsboro Peak; Station 26, Holden's Spring.

Euconulus fulvus (Drap.).

Everywhere along the crest, from Sawyer Peak to Black Canyon. Also in drift at Station 1, Gallina Creek, and below Kingston; Oliver Mine near Chloride; San Mateo Mountains.

LIMACIDÆ.

Agriolimax campestris (Binn.).

Taken at 6 stations in the wooded zone of the Black Range.

PUPILLIDÆ.

Pupilla blandi pithodes n. subsp.

The shell is short, cylindric with rounded ends, chestnut brown, slightly shining. Whorls somewhat convex, the last slowly ascending a little in front, somewhat flattened and tapering to the rather narrow base, noticeably contracted behind the lip, having a quite low (or sometimes rather strong) crest, of the same color as the rest of the shell, behind the contraction. Parietal lamella deeply placed, about one-third of a whorl long. Lower palatal plica rather long. Columellar lamella well developed, short.

Length 3.2, diam. 1.8 mm.

Black Range, abundant in the forested zone, chiefly among aspens. Type locality, Station 39, around the cattle-trap and lake between McKnight's and Mimbres forester stations.

It was taken at stations 5, 9, 16½, 17, 26, 28, 30, 31, 33, 34, 37, 39, 42 and 47, well scattered over the ridge and upper slopes from Sawyer Peak to Black Canyon. Single bleached shells were taken in the drift debris of Gallina Creek at Station 1, and in the debris of Middle Percha Creek below Kingston. These were doubtless carried down from the forest zone by freshets.

This is relatively wider and shorter than *P. blandi*, with a far less developed crest behind the lip. Typical *P. blandi* is a decidedly smaller shell.

Pupoides marginatus (Say).

A bleached shell was found in drift of the Middle Percha Creek below Kingston, therefore in the foothills rather than the Black Range itself.

Gastrocopta pellucida hordeacella (Pils.).

Middle Percha Creek, below Kingston. Not found in the mountains.

Gastrocopta pilsbryana (Sterki).

Not uncommon on top. It was taken at 8 stations between Silver Creek and McKnight's ranger cabin. Also on Mineral Creek, near the Oliver Mine, Station 52, and in the Cuchillo Mountains.

Gastrocopta ashmuni (Sterki).

Stations 16, Iron Creek, and 54, Little Palomas Creek, a single shell at each. The former station, probably above 7,500 feet, is unexpected, and above its usual zone in this part of New Mexico.

Gastrocopta quadridens Pils.

Stations 16½, Iron Creek near Wright's cabin, and 28, south side of Hillsboro Peak.

Vertigo coloradensis arizonensis P. and V.

Taken at 10 stations along the range, above 7,500 feet, and doubtless to be found in the forest zone wherever minutiæ are looked for, especially among aspens.

Vertigo modesta n. subsp.

This new subspecies will be described in the next paper of this series. It was taken in the Black Range at stations 1, 9, 16½, 24. 26, 28, 30, 34, 39, 47.

VALLONIIDÆ.

Vallonia perspectiva Sterki.

Silver Creek, Station 9, elevation 8,000 feet, in the forest zone, and above its usual range. Much lower down it was taken at Stat on 42, Black Canyon, about 4 miles below the crest; in drift of the Middle Percha below Kingston; Station 54, on Little Palomas Creek, and in the Cuchillo Mountains.

Vallonia cyclophorella Ckll.

On the crest at stations 16½, 39, and 47.

FERUSSACIDÆ.

Cochlicopa lubrica (Müll.).

Found sparingly but generally spread throughout the Black Range, from Silver Creek to Black Canyon; also on lower levels at Station 1, Kingston, Little Palomas Creek, Cuchillo and San Mateo Mountains.

SUCCINEIDÆ.

Succinea avara Say.

Station 1, Gallina Canyon; Middle Percha below Kingston. Not in the forest zone.

PHYSIDÆ.

Physa sp. undet.

Middle Percha Creek, Kingston; Animas River near junction of Cherry Creek; both in the eastern foothills of the Black Range.

Collecting Stations in the Black Range.

Many of the stations are plotted on the maps, pp. 84 and 85; most of the others may be located by their relation to those plotted.

1. Middle branch of Gallina Creek about 2 miles above Pryor's upper cabin.
2. Same, 4 miles above cabin, at the fork.
3, 4. Limestone ledges on north and south sides of Silver Creek, a few hundred yards above Mitchell Gray's cabin (7,500 feet).
4½. Silver Creek just below the "box," where the trail makes a detour.
5. Silver Creek above the box, on north side, near a deserted cabin.
6. Silver Creek, north side, a short distance above Station 5.
7. Silver Creek, north side, above the preceding.
8. Saddle above the head of Silver Creek.
9. South side of the "box" of Silver Creek.
10. Gulch tributary to Silver Creek on north side, near Strohm's "mine."
11, 12. Gulch tributary to Silver Creek, about a mile south of Gray's cabin, and not far from the same elevation.
12½. About a half mile above Spade's cabin, on Little Gallina Creek.
13. Branch of the head of Spring Creek (Bull Top Creek ?).
15. Outcrop of limestone on east side of Spring Creek, where a small ravine enters from the east.
16. Iron Creek, where a ravine with numerous prospect holes enters from the south, between confluence of Spring Creek and Wright's cabin.
16½. Wright's cabin, near the head of Iron Creek.

17. Western side of the north summit of Sawyer Peak about 500 feet below the summit.
17½. Same vicinity, 3–500 feet below summit.
18. Northeastern flank of Sawyer Peak, a half mile below camp on saddle.
19. Ravine next up the trail to Sawyer Peak from Grand Central Mine.
20. Grand Central Mine, on the mine side of the ravine.
21. About 2 miles east of the trail from Sawyer Peak to Grand Central Mine, and not much higher than the mine.
22. Ravine north of Station 19.
23. A limestone ledge, 20 minutes' walk down the mountain east from the camp on the saddle of Sawyer Peak.
23½. Hillside south of Wright's cabin near head of Iron Creek.
24. Top of the steep trail north of Wright's cabin.
25. Just above the box of Holden Prong of Animas Canyon, several miles below Holden's Spring.
26. Hillside southward above Holden's Spring.
27. A branch of Noonday Canyon, heading opposite Holden Spring, perhaps 2 miles down.
28. South side of Hillsboro Peak, among aspens.
29. Branch of Animas Canyon 1 mile west of Animas ranger cabin.
30. Branch of McKnight Canyon, running westward, about 3½ miles west of Animas cabin and 2 miles from the summit trail.
31. Drift debris of Middle Percha Creek, near Kingston.
32. Garden of Mr. Stephen Reay, west end of Kingston.
33. Along summit trail, 2 or 3 miles north of Animas ranger cabin.
34. About half way between Animas and McKnight's ranger cabins, in aspens along the summit trail.
35. Rocky hillside about 2 miles north of McKnight's cabin, along the trail.
36. Rocky slide facing south about a mile north of McKnight's cabin.
37. Head of McKnight's Canyon.
38. McKnight's Canyon below the "box."
39. Around lake and cattle-trap, on the shoulder of Mimbres Peak.
40. Eight miles north of McKnight's cabin, on trail.
41. About 1½ miles south of Black Canyon ranger station.
42. Black Canyon about 3 to 4 miles below Reed's ranch.
43. Bear Wallow, Reed's ranch, among aspens.
44. Head of Morgan Creek, near the Hermoso trail. Stations 45, 47 and 48 are in the same vicinity.
45. North and west sides of the head of Morgan Creek.
46. Rock slides south of Reed's ranch.
47. Trail half a mile south of Reed's ranch.
48. Morgan Creek, ¼ mile below Station 44.
49. Black Canyon, 1 mile above Diamond Bar Ranch.
50. Diamond Creek, about 4 miles below crest of range.
51. Diamond Creek, about 3 miles below crest of range.
52. Mineral Creek at Oliver Mine, 4 miles above Chloride.
53. Sam's Canyon, 4 miles south of Chloride.
54. Limestone Mountain on Little Palomas Creek, 2 miles north of Bob's ranch.
55. First mountain across creek above forks at Ocean Wave Mine, Big Palomas Creek near Hermosa.
56. Next peak below 55.
57. Reservoir on the Animas near mouth of Cave Creek, ranch of Rue Panka.
58. Rock slides on south side of Cave Creek between its mouth and the trail to Hillsboro.

Cuchillo Range. Three stations at the south end of this small range, 6 miles east of Chloride.

San Mateo Range, in the south end, 6 miles from Monticello. Several rock slides, in the vicinity of Chippy Creek and on the southern slope, were investigated.

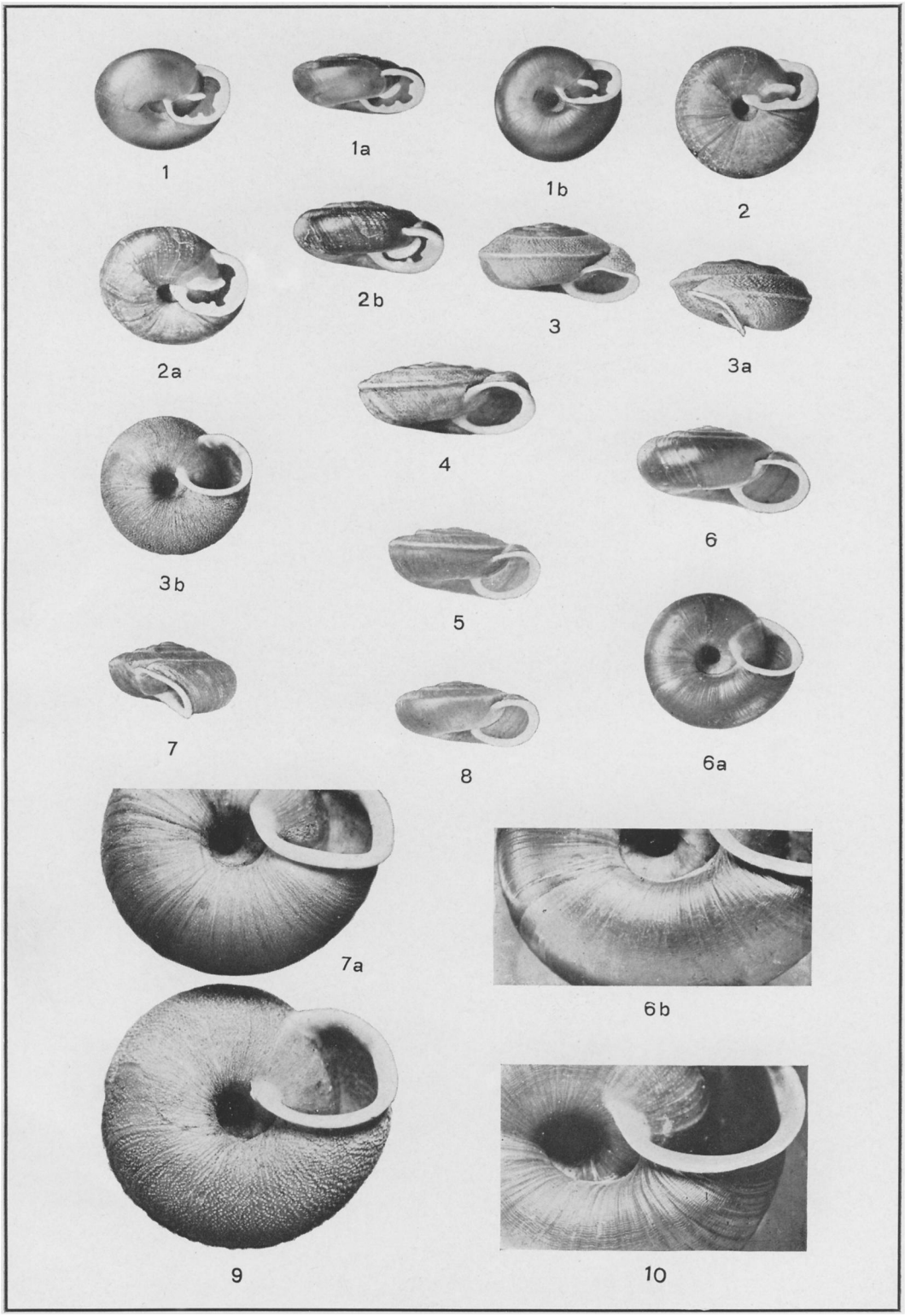
Explanation of Plates VII, VIII, IX, X.

Plate VII.—Figs. 1, 1*a*, 1*b*.—*Ashmunella tetrodon fragilis* n. subsp. Type. Station 58. No. 115,753.
Figs. 2, 2*a*, 2*b*.—*Ashmunella tetrodon animorum* n. subsp. Type. Station 26. No. 115,747.
Figs. 3, 3*a*, 3*b*.—*Ashmunella cockerelli* n. sp. Type. Station 19. No. 115,748.
Fig. 4.—Depressed specimen of the same lot.
Fig. 5.—*Ashmunella cockerelli argenticola* n. subsp. Type. Station 4½. No. 115,749.
Figs. 6, 6*a*, 6*b*.—*Ashmunella mendax* n. sp. Type. Station 16. No. 115,754.
Figs. 7, 7*a*.—*Ashmunella cockerelli perobtusa* n. subsp. Type. Station 21. No. 115,750.
Fig. 8.—*Ashmunella binneyi* n. sp. Type. Station 8½. No. 115,751.
Fig. 9.—*Ashmunella cockerelli* n. sp. Enlarged view of type.
Fig. 10.—*Ashmunella mogollonensis* Pils. Enlarged view of specimen from the Mogollon Range.

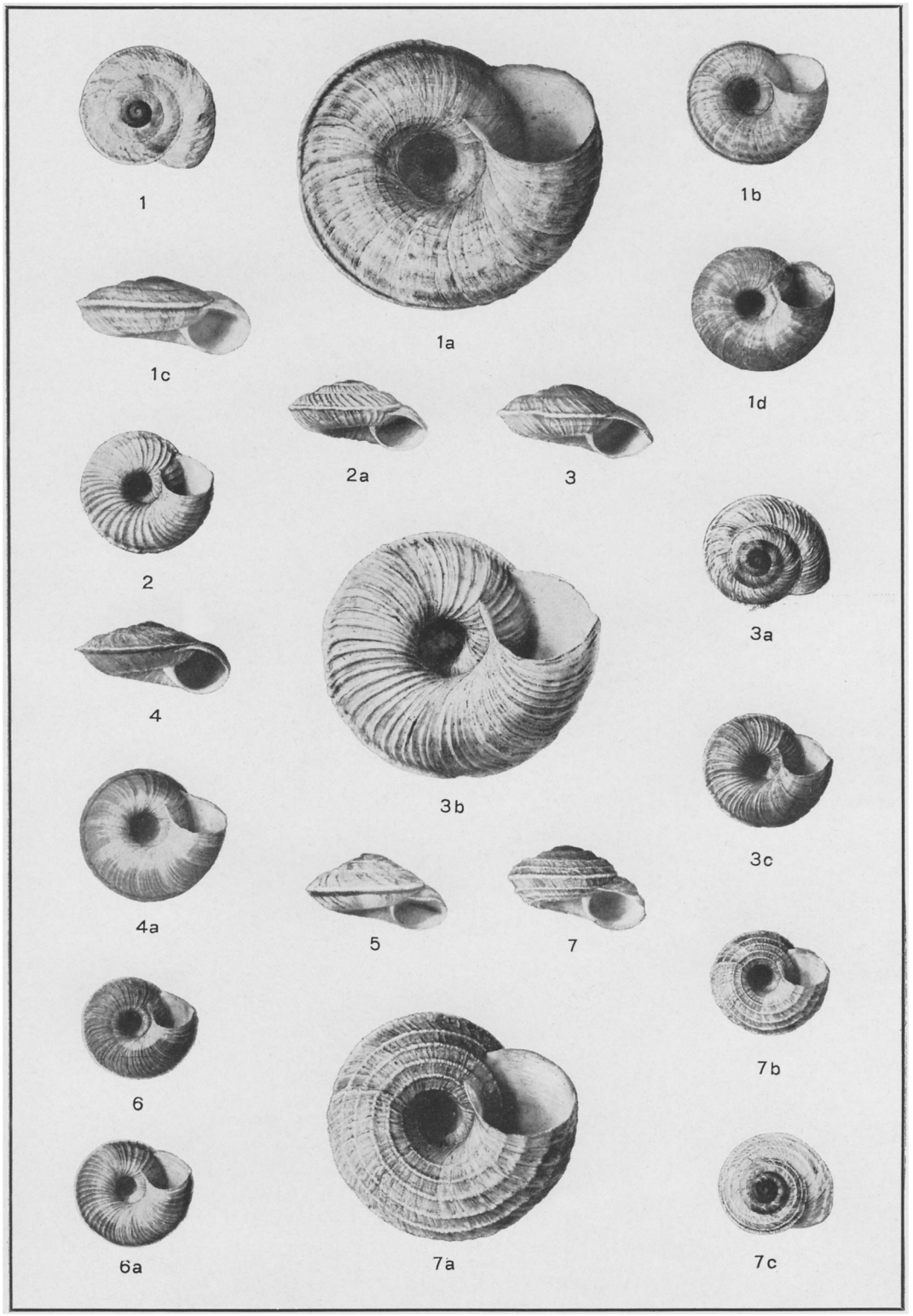
Plate VIII.—Figs. 1–1*c*.—*Oreohelix metcalfei concentrica* n. subsp. Type. Station 7. No. 115,755. 1*d*, dark specimen of same from Station 22.
Figs. 2, 2*a*.—*Oreohelix metcalfei radiata* n. subsp. Station 15.
Figs. 3–3*c*.—*Oreohelix metcalfei radiata* n. subsp. Type. Station 15. No. 112,899.
Figs. 4, 4*a*.—*Oreohelix metcalfei acutidiscus* n. subsp. Type. Station 23. No. 115,757.
Fig. 5.—*Oreohelix metcalfei* Ckll. Type. No. 10,941.
Figs. 6, 6*a*.—*Oreohelix metcalfei radiata* n. subsp. Station 16.
Figs. 7–7*c*.—*Oreohelix pilsbryi* Ferriss. Type. Station 52. No. 112,918*a*.

Plate IX.—Figs. 1–1*b*.—*Oreohelix metcalfei cuchillensis* n. subsp. Type. No. 115,760.
Fig. 2.—*Oreohelix swopei* n. sp. Elevated example from Station 45.
Figs. 3–3*b*.—*Oreohelix swopei* n. sp. Type. Station 45. No. 112,896.
Figs. 4–4*b*.—*Oreohelix metcalfei hermosensis* n. subsp. Type. No. 115,759.
Figs. 5, 5*a*, 6, 7.—*Oreohelix cooperi* (W. G. B.). Station 9. No. 115,280.
Figs. 8, 8*a*.—*Oreohelix cooperi* (W. G. B.). Station 4½. No. 115,156.
Fig. 9.—*Oreohelix cooperi* (W. G. B.). Station 26. No. 115,306.
Fig. 10.—*Oreohelix metcalfei concentrica*. Embryos. No. 115,315.
Fig. 11.—*Oreohelix metcalfei radiata*. Embryos. No. 115,319.
Fig. 12.—*Oreohelix metcalfei hermosensis*. Embryos. No. 112,922.
Fig. 13.—*Oreohelix swopei*. Embryos. Station 41.

Plate X.—Fig. 1.—*Ashmunella mendax* n. sp. Station 16.
Fig. 2.—*Ashmunella cockerelli* n. sp. Station 20.
Fig. 3.—*Ashmunella mogollonensis* P. and F.
Fig. 4.—*Ashmunella cockerelli perobtusa* n. subsp. Station 21.
Fig. 5.—*Ashmunella binneyi* n. sp. Station 7.
Fig. 6.—*Ashmunella tetrodon* P. and F. San Mateo Mountains. No. 112,921.



PILSBRY AND FERRISS: MOLLUSKS OF THE BLACK RANGE, NEW MEXICO.



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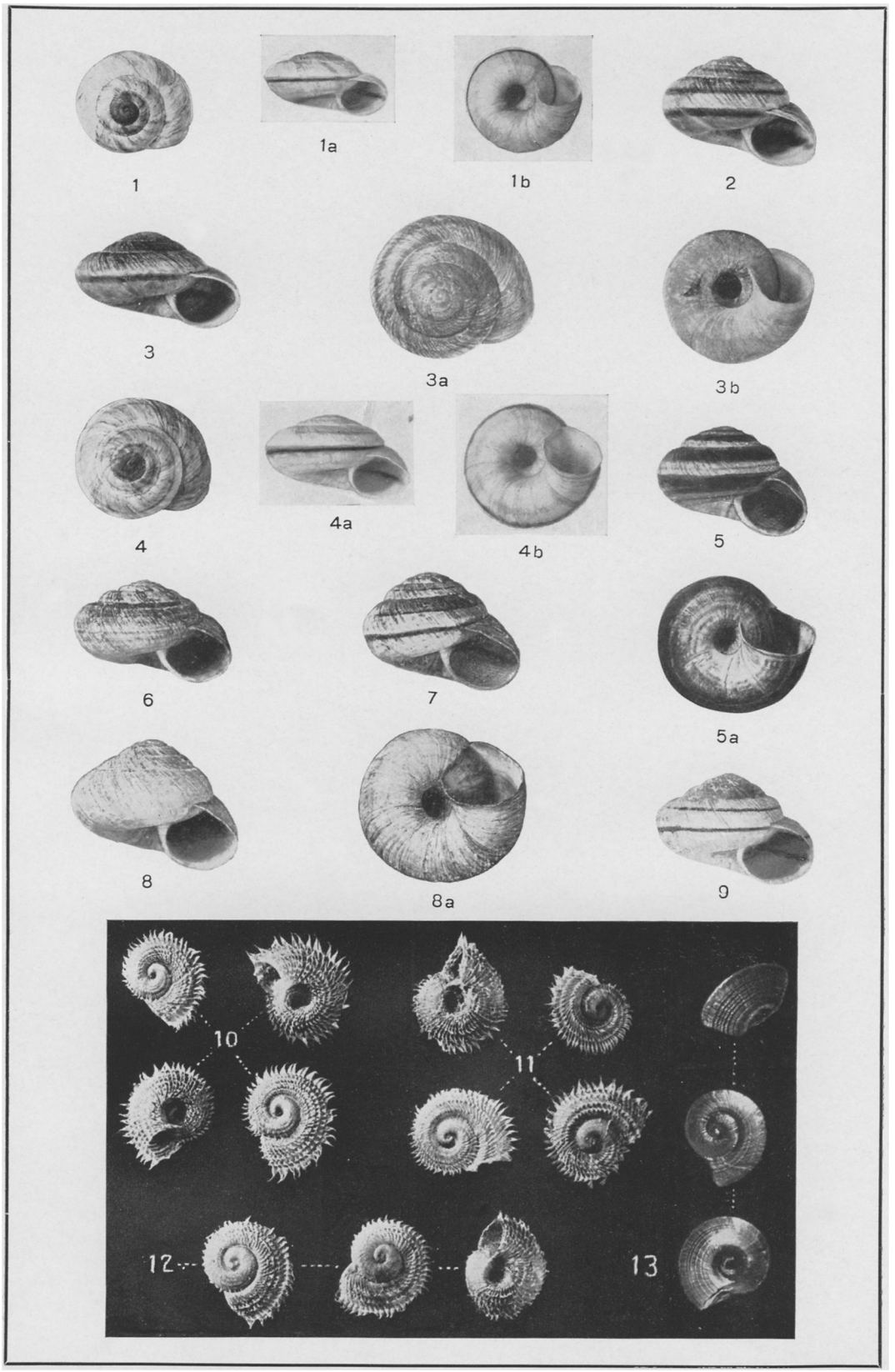

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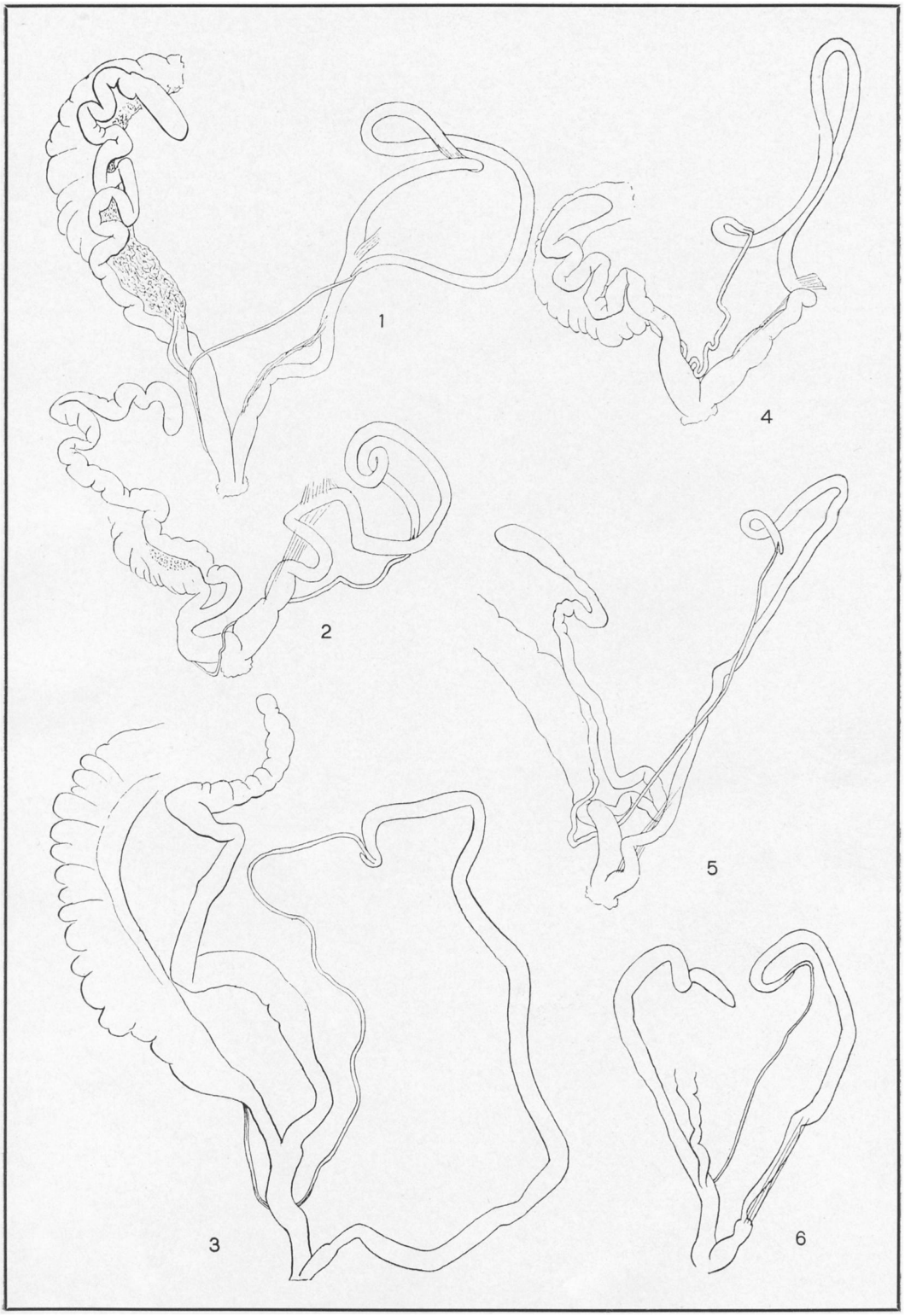

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